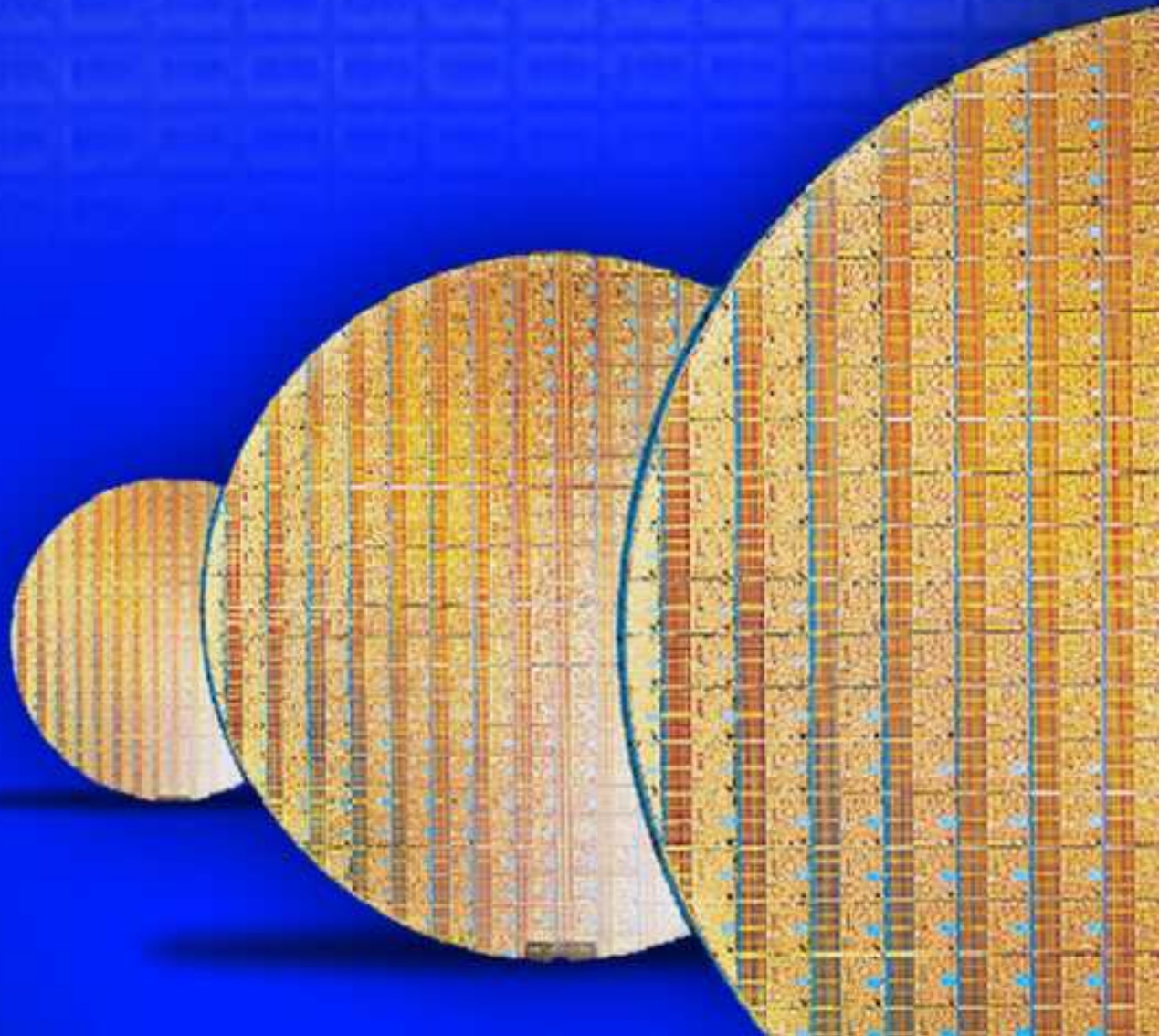


Itanium® 2 Processor in the Enterprise



intel®

Agenda

- **Itanium® 2 Processor Overview**
- **Eco system support / Intel's commitment**
- **Key Reasons why Itanium**
- **Summary**



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Evolving Server Platforms

Current architecture or solutions

Large SMP
systems
e.g. Database,
ERP, BI, HPC



Transition benefits

Outstanding performance
with choice of OS and
vendor today

Architecture of choice



Premier performance, reliability and
scalability 64-bit architecture

IA-32
architecture



Extended memory
capability when needed

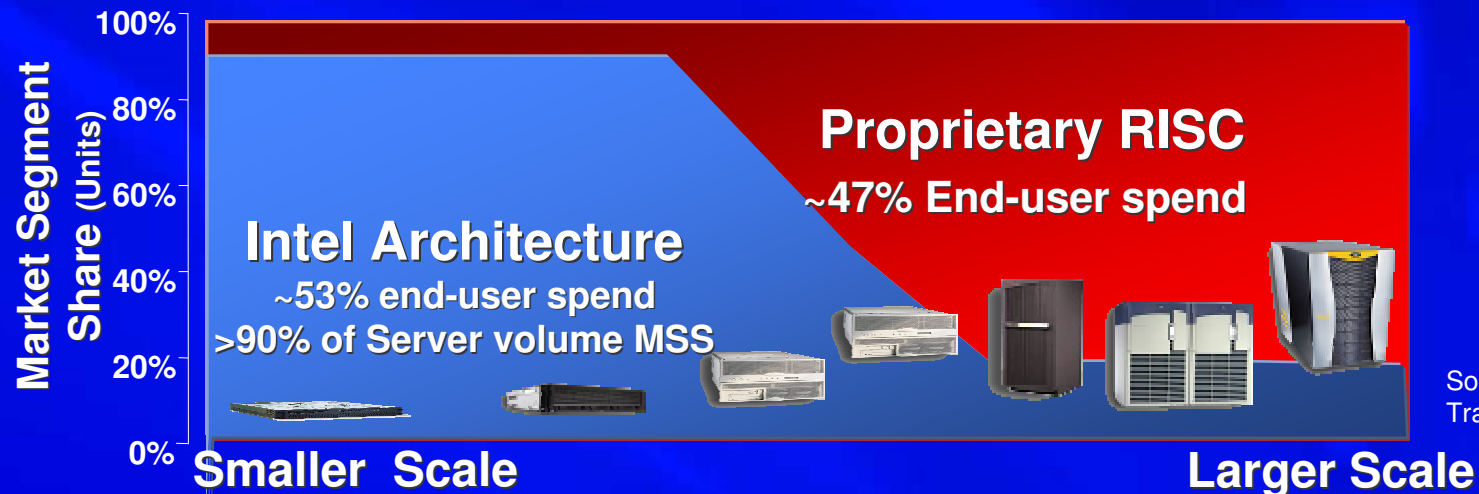


IA-32 architecture with 64 addressability
Broadest range of 32bit apps



Architectural Choice & Flexibility

Intel's Enterprise Strategy



Xeon™ Processor Family

- **Continue** to address needs of volume market segments
- **Platform-level innovations**, to provide differentiated value
 - Manageability, virtualization, security, power, capacity on demand, Intel® EM64T

Itanium® Processor Family

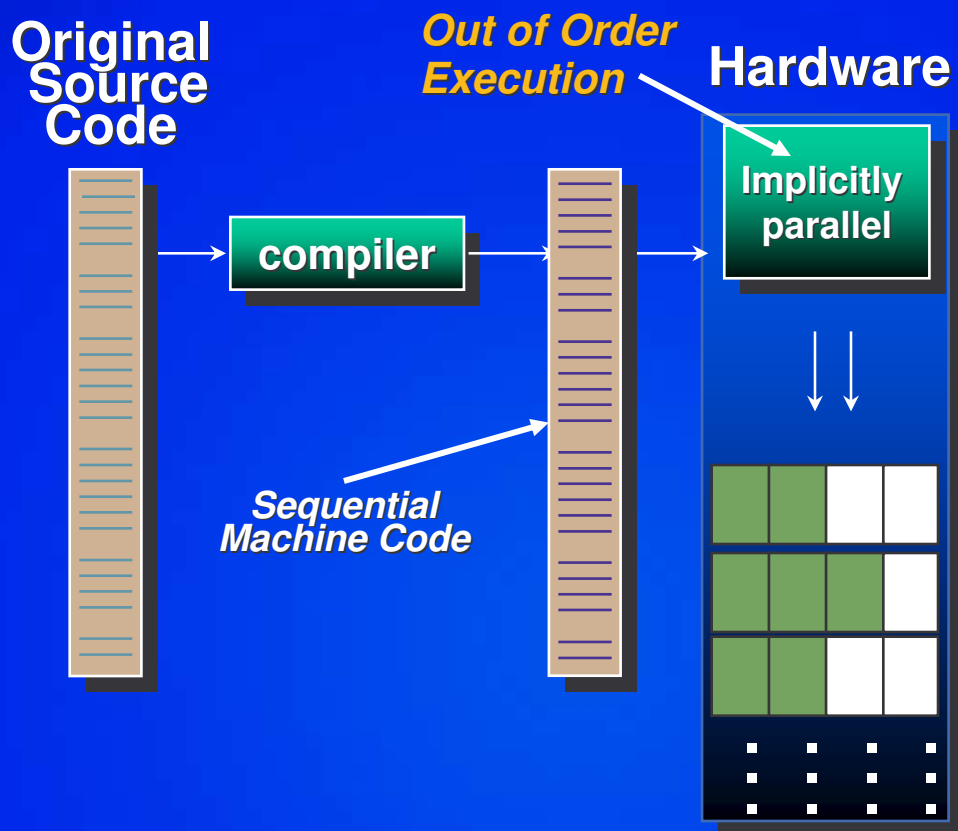
- **Grow** in the proprietary RISC segments
- **Differentiate**
 - **From RISC**: cost, performance, vendor choice
 - **From Xeon™ processor**: performance, RAS, scalability

Solutions to IT business challenges

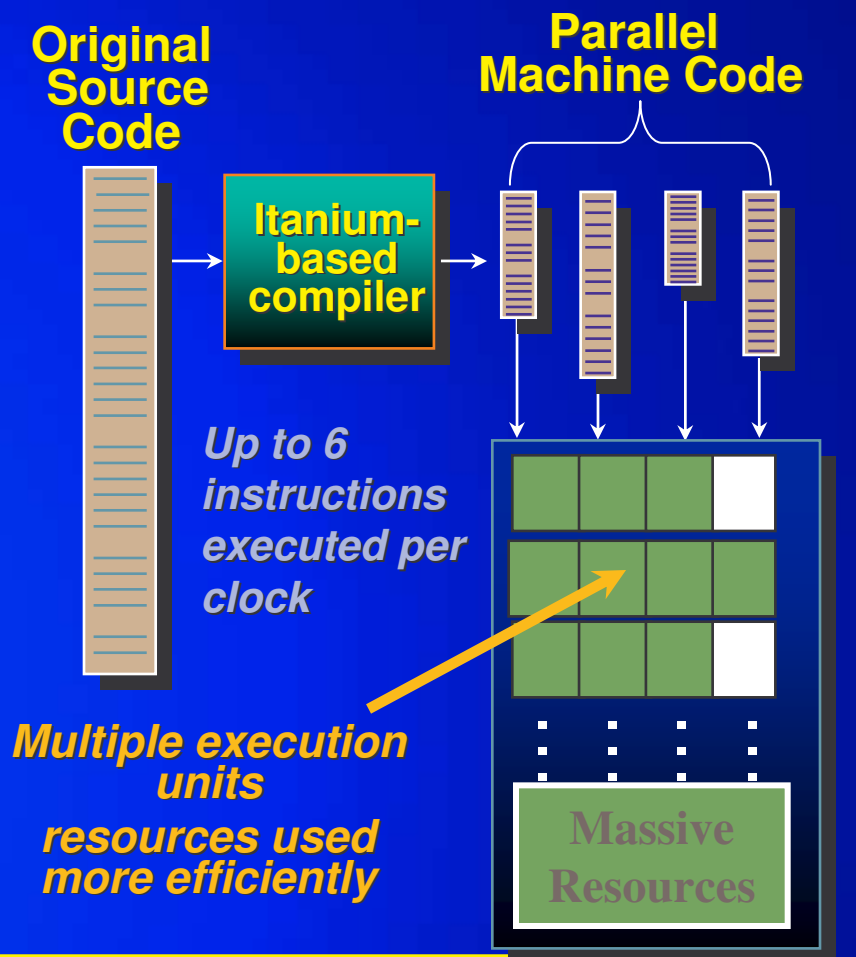


Xeon™ / Itanium® Processor Architecture Difference

Traditional Architecture



Itanium® Architecture



Itanium Processor Family = new Architecture + more Reliability + more Scalability features



Xeon™, Itanium™, NetBurst™

*All 3rd party names and brands are property of their respective owners. All products, plans, dates, and other information provided is preliminary and subject to change without notice

Intel® Itanium® Architecture Growth

MARKET

- Strong growth: 1.7x Q1'04 to Q1'05
- #2 Architecture in Top500 list of Supercomputers (as of Oct'05)
- Itanium® 2 Processor based System revenue >25% of Power

IDC Worldwide Quarterly Server Tracker, August 2004

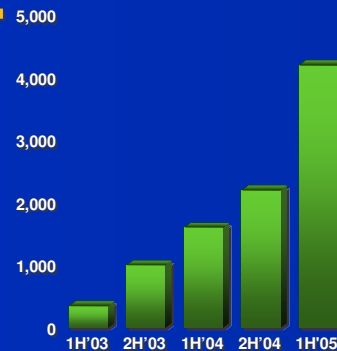
HARDWARE

- Number of server SKUs keep growing

	2002	2003	2004
2P, 4P	20	50	70
8P - 128P	5	15	20

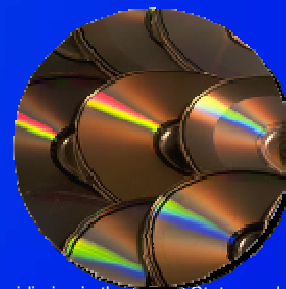
SOFTWARE

- Over 160% Y/Y growth
- >5000 Applications Today



END-CUSTOMERS

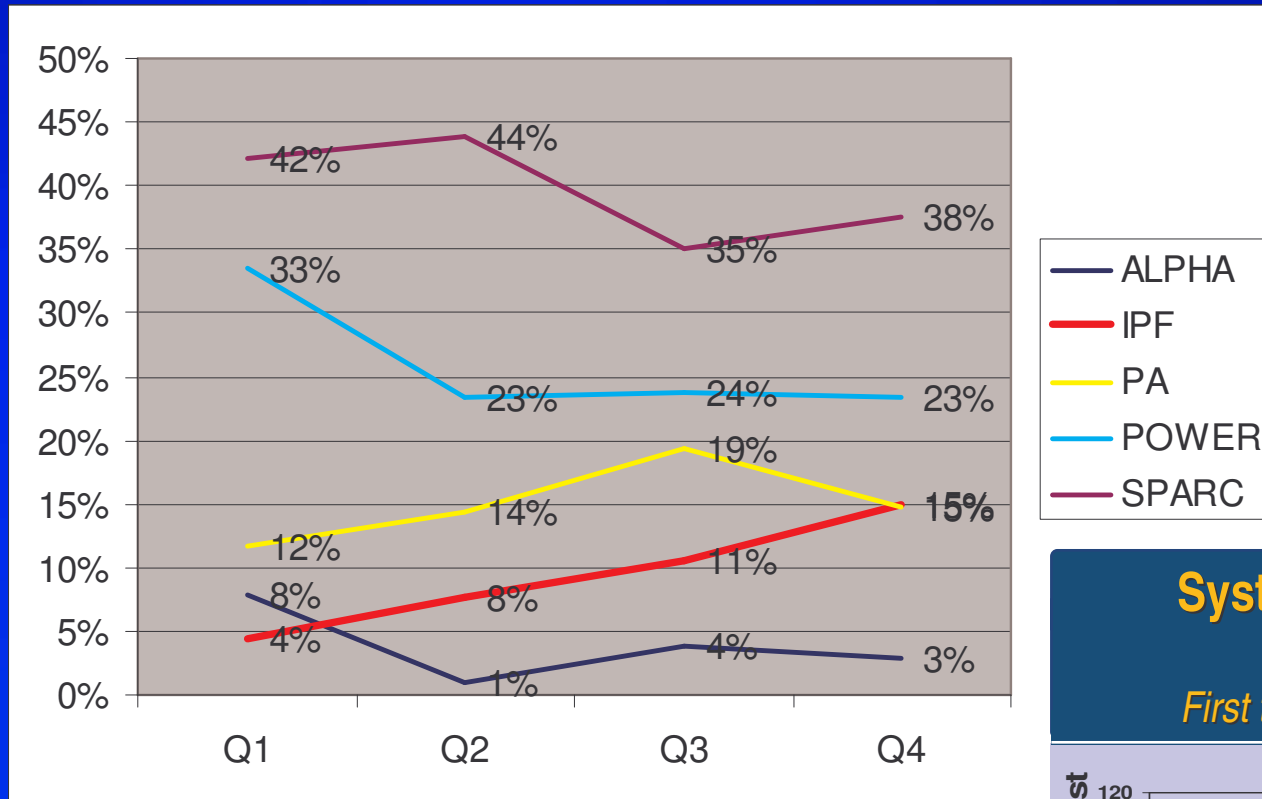
- 51 of Global 100 companies deployed Intel Itanium-based servers today
 - 9 out of top 10,
 - 6 top automotive, 5 top energy
- High profile wins: Airbus, BMW, Pfizer, Thomson Financial, Procter and Gamble, The Weather Channel, , Motorola



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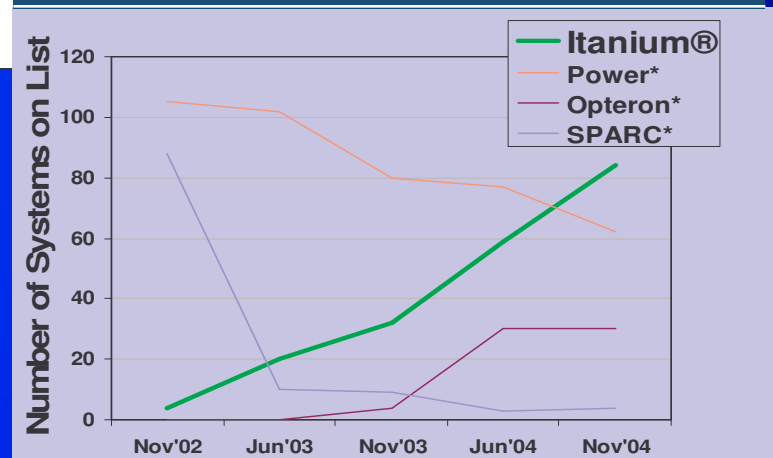
Server Segment >25k\$ – GER 2004



Source: Gartner

Systems in HPC Top500 by Architecture

First time to pass top RISC arch





Itanium[®] Architecture Momentum

End User Adoption

Deployed by the

Top 6 Automotive

companies, & **8 of the top 10**

★Toyota ★Hyundai
★DaimlerChrysler
★Volkswagen Fiat
★BMW Volvo
Audi Pirelli

Deployed by **7 of the top 8**

Computer & Electronics

★HP Intel companies ★NEC
★Samsung ★Fujitsu

Deployed by the

Top 5 Energy

companies, & **8 of the top 10**

★BP ★Marathon Oil
★Total ★PetroChina

**51 of the world's
100 largest corporations
run Itanium 2-based
systems**

★ Represents Global 100 company

Deployed by the

Top Insurance

company, & **2 of the top 3**

★ING CNA

Deployed by the

Top Financial Services

company, & **5 of the top 9**

CitiStreet Commerzbank
NASDAQ Bank of New York
Thompson Financial

Deployed by the

4th largest Telecom

company
Motorola
Korea Telecom
Telefónica Argentina
Telecom Italia

Deployed by **2 of the top 3**

Consumer Goods

companies
Fuji Film
★Proctor & Gamble



Industry Leaders Rely on Itanium Architecture

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Source: Intel Corporation, 4/05 - statistics based on Fortune's Global 100 ranking of largest companies published in 2004

Agenda

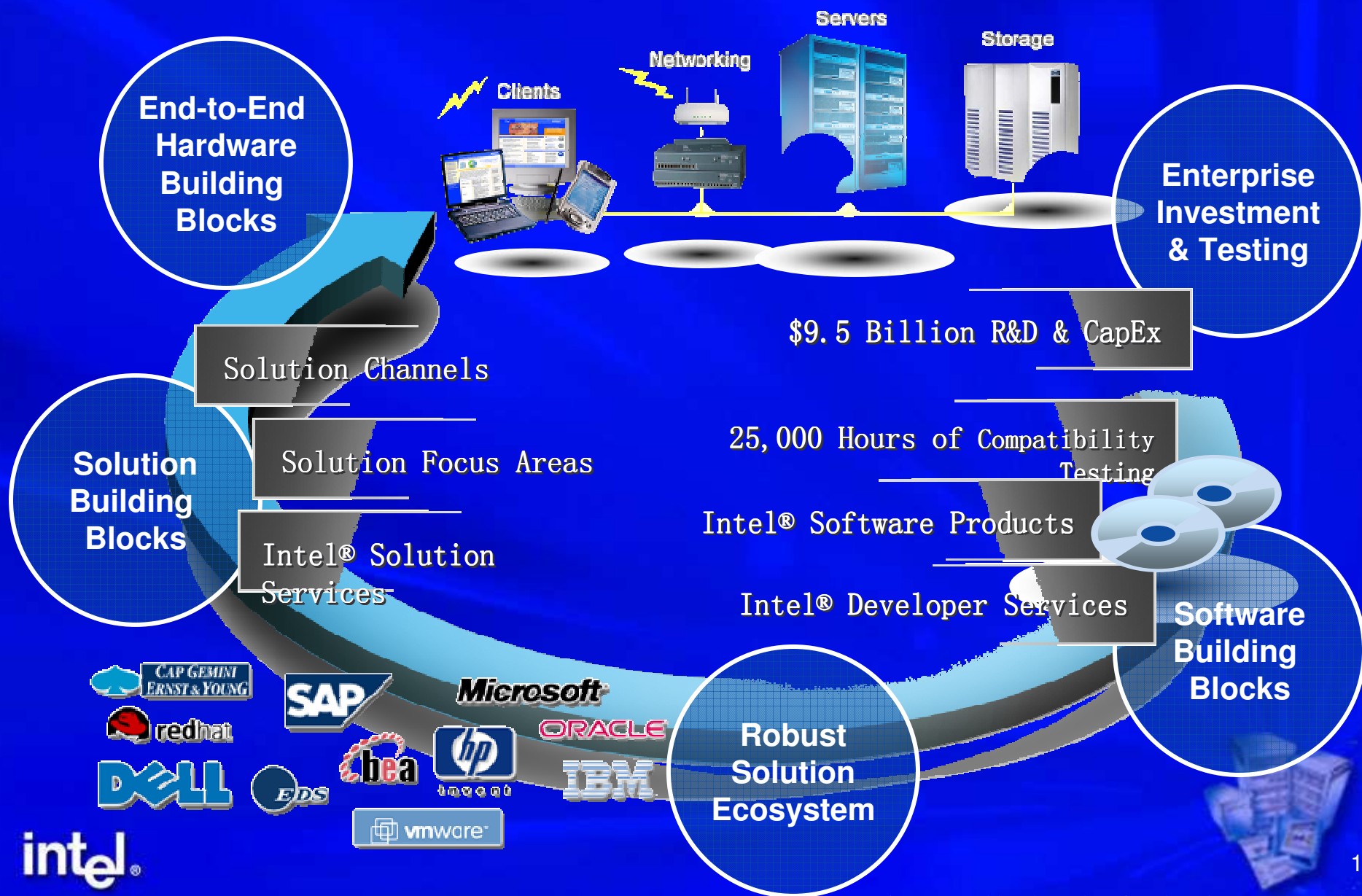
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Intel's Deep Commitment to Enterprise and...



Commitment to Itanium® Architecture

- ✓ 4 generations of Itanium® 2-based products in definition and development
- ✓ >1200 Intel software engineers working on Itanium 2-based tools, compilers, and ecosystem
- ✓ >5000 certified applications available
- ✓ Excellent support of x86 applications with IA-32 Execution Layer technology
- ✓ Demonstrated success in complete software stacks

Heavy investment reflects deep commitment



Increasing Investment In Itanium®



News Release, Sept. 15, 2005

INTEL TO INVEST \$345 MILLION AT TWO U.S. MANUFACTURING SITES Company to Upgrade Facilities in Colorado and Massachusetts

....Separately, the company [Intel] also announced that after an extensive search for a suitable location it has signed an agreement to purchase office property in Ft. Collins, Colorado, to be used as a design center to house a portion of the company's Itanium® processor design team.



Hiring Engineers = Long Term Commitment



Agenda

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Key Arguments for Itanium®2 Processor

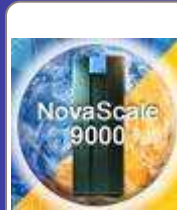


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SW Platform: Windows, HP/UX, and the top 5 Linux
- 2) Scalability: **Itanium® 2 Processor scale from 2 – 512 ways**
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- 6) Investment protection: **Drop in promise from Itanium® 2 Processor to Montecito
No Box replacement necessary**
- 7) Economy of scale **Itanium® 2 processor based platforms deliver
excellent TPC-C Price/Performance**
- 8) Longevity: **Rich Long Term Roadmap.**



Choice is Important

**Itanium®
Architecture**



NEC



PX9000

FUJITSU



PRIMEQUEST

UNISYS
Imagine it. Done.



ES7000

HITACHI
Inspire the Next



BladeSymphony



HP Integrity +
Integrity NonStop

sgi



Altix 3700

**Itanium®
Architecture**



**红旗®
Linux**

HP NonStop OS



OpenVMS*





Itanium® Architecture Momentum

Broad Eco System Support

Application Choice



- >3600 native applications
- 32-bit application support with IA-32 Execution Layer

Operating System Choice



- Windows*, Linux*, Unix*, & VMS support

System Vendor Choice



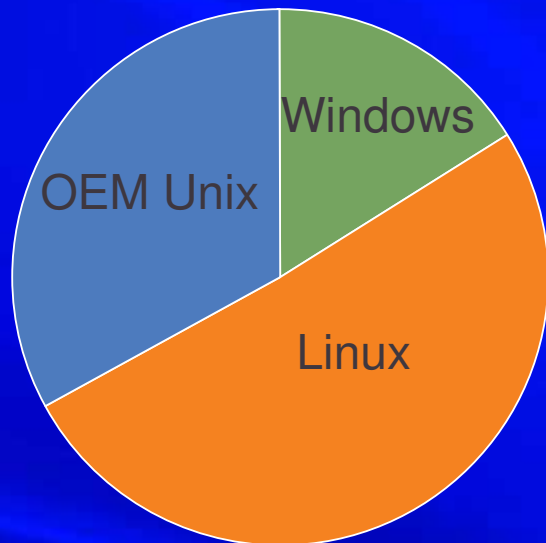
- Broad selection from top global & regional OEMs
- 2-way to 512-way systems
- >15 large SMP systems

Broad industry support
Choice that you don't get with RISC

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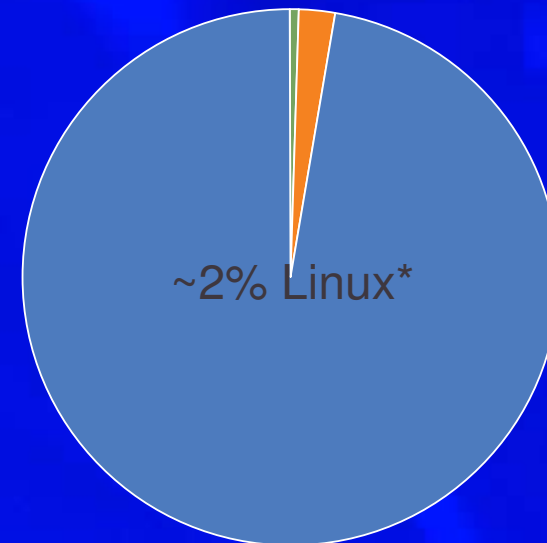
Architecture by O/S Comparison

Itanium 2 Architecture



■ Windows ■ Linux ■ OEM O/S

Power* & Powerpc



■ Other ■ Linux ■ IBM O/S

Based on unit shipments reported in Q4'04 IDC Server Tracker, includes Power and Powerpc*



Key Arguments for Itanium®2 Processor



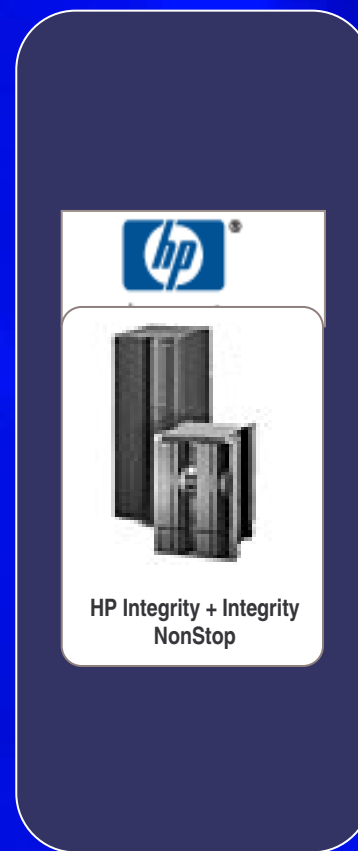
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Some High End Itanium® 2 Processor Enterprise Product Lines



16/32-Sockets



64-Sockets



512-Sockets

Key Arguments for Itanium®2 Processor

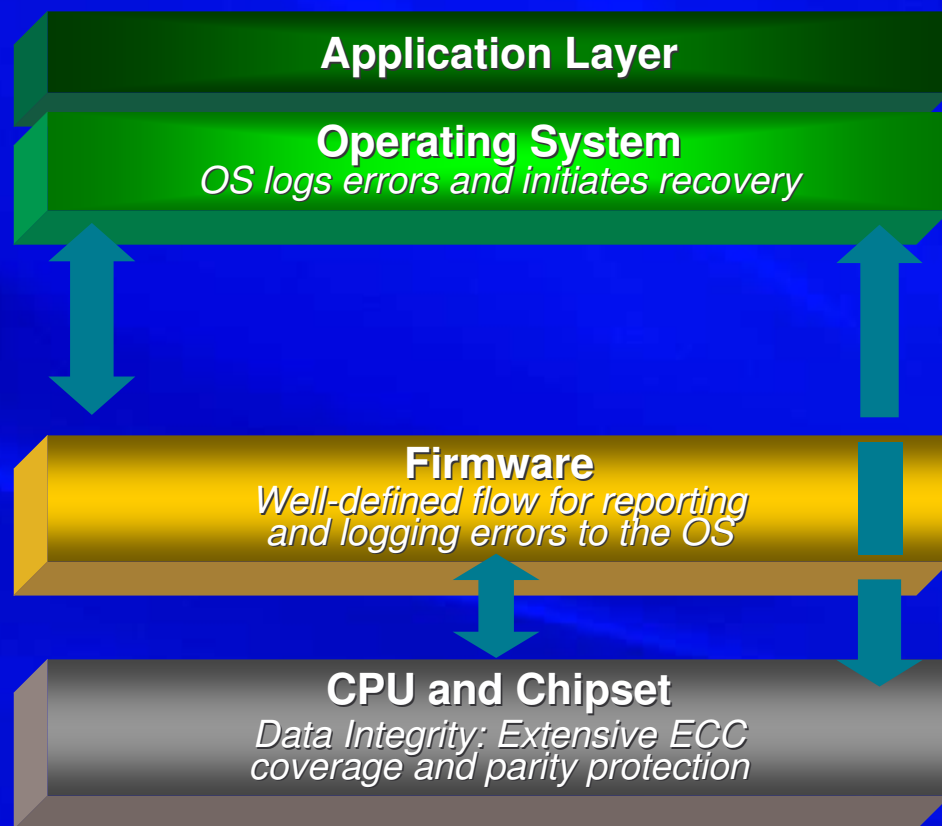


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Advanced RAS Features

Itanium® 2 Processor RAS Machine Check Architecture



Supported System-level RAS Features

- Hardware partitioning
- Operating system features[†]
 - Fatal and corrected error processing
 - Corrected error reporting policies
 - Error prediction
 - MCA error records via WMI

[†]Supported features vary by operating system

- Machine Check Architecture Minimizes Loss, Corruption, Downtime
- Open Framework Enables Industry Wide Innovation



Hi-End Server Architecture Reliability Comparison

Characteristic	Itanium® 2 Processor	IBM Power*	Intel Xeon™ MP Processor	Sun UltraSparc*	Intel Xeon™ Processor	AMD Opteron*
Error recovery on data bus (ECC)	✓	✓	2005	✓		
Cache ECC coverage	✓	✓	✓	✓	✓	✓
Internal logic soft error checking	2005	2004				
Processor lockstep support	✓		✓			
Bad data containment	✓	✓				
Cache Reliability (Pellston)	2005	✓				
Memory single device error correct	✓	✓	✓	✓	✓	✓
Memory retry on double-bit error	✓	✓	✓		✓	
Memory spares	✓	✓	✓		✓	
Partitioning	✓ node	✓ core	✓ node	✓ node		
Electrical isolated partitions	✓ node		✓ node	✓ node		

**Itanium® Processor based platforms:
leadership reliability features**



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Enabling Reliability



HP Integrity
NonStop

3 Seconds per
Year

99.99999%

IBM zSeries

5 Minutes 15
Seconds Downtime
per Year

99.999%

0 1 2 3 4 5 6
Minutes



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Key Arguments for Itanium®2 Processor



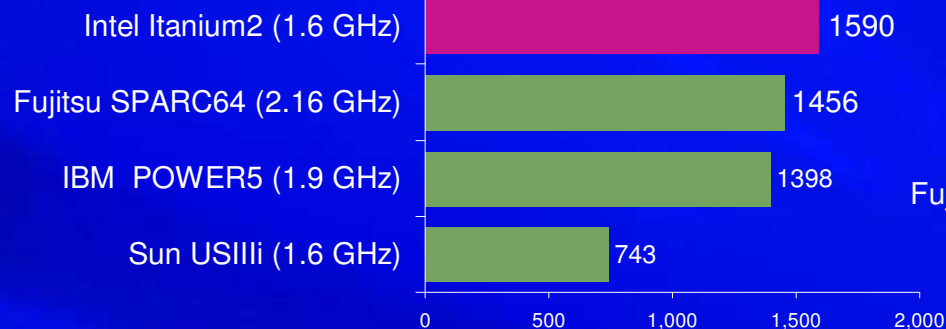
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EPIC/RISC Processor performance

SPECint_base2000

Best SPECint_base2000 for each processor



SPECfp_base2000

Best SPECfp_base2000 for each processor



- ✓ Itanium delivering more performance at a lower frequency
- ✓ Head room for the future

Reference: <http://www.spec.org/>

(As of 06/20/2005)

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Performance With Choice

-Not a proprietary solution

TPC Transaction Processing
Performance Council

The TPC defines transaction processing and database benchmarks and delivers trusted results to the industry.

- Home
- Results
- Benchmarks
 - TPC-App
 - TPC-C
 - **Results**
 - Description
 - FAQ
 - TPC-H
 - TPC-W
 - Pricing Spec
 - Obsolete
 - TPC-A
 - TPC-B
 - TPC-D
 - TPC-R
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Top Ten TPC-C by Performance

Version 5 Results As of 13-Sept-2005 12:46 PM [GMT]



Note 1: The TPC believes it is not valid to compare prices or price/performance of results in different currencies.

☒ All Results
 ☐ Clustered Results
 ☐ Non-Clustered Results
 Currency All

Rank	Company	System	tpmC	Price/tpmC	System Availability	Database	Operating System	TP Monitor	Date Submitted
1		IBM eServer p5 595 64p	3,210,540	5.19 US \$	05/14/05	IBM DB2 UDB 8.2	IBM AIX 5L V5.3	Microsoft COM+	11/18/04
2		IBM eServer p5 595 32p	1,601,784	5.27 US \$	04/20/05	Oracle Database 10g Enterprise Edition	IBM AIX 5L V5.3	Microsoft COM+	04/20/05
3		HP Integrity rx5670 Cluster 64P	1,184,893	5.52 US \$	04/30/04	Oracle Database 10g Enterprise Edition	Red Hat Enterprise Linux US 2.6	BEA Tuxedo 8.1	12/08/03
4		HP Integrity Superdome 64P c/s	1,082,203	5.38 US \$	12/07/05	Microsoft SQL Server 2005 Enterprise Edition 64bit	Microsoft Windows Server 2003 Datacenter Edition 64-bit	Microsoft COM+	06/07/05
5		IBM eServer pSeries 690 Model 7040-681	1,025,486	5.43 US \$	08/16/04	IBM DB2 UDB 8.1	IBM AIX 5L V5.2	Microsoft COM+	02/17/04
6		HP Integrity Superdome	1,008,144	8.33 US \$	04/14/04	Oracle Database 10g Enterprise Edition	HP-UX 11.12 64-bit	BEA Tuxedo 8.0	11/04/03

Other names and brands may be claimed as the property of others.
Source: www.tpc.org 13.09.05

High Performance Computing : Top 500

	Count	Share %	Rmax Sum (GF)	Rpeak Sum (GF)	Procs Sum
Pentium4 Xeon	232	46.4	422375	810977	142065
Itanium2	84	16.8	190357	243070	42048
HP	50	10	52503	92016	26064
Opteron	30	6	61729	102444	24796
Power4+	26	5.2	90730	174387	24042
Power4	19	3.8	34874	68089	12966
Alpha	12	2.4	32414	46182	23512
Nec	10	2	47177	52669	6488
PowerPC	8	1.6	127194	176979	51664
Power	8	1.6	24465	36742	27732
Cray	7	1.4	16298	17869	1396
Hitachi SR8000	4	0.8	5152	6314	1548
Sparc	4	0.8	12076	24535	5348
MIPS	2	0.4	2461	4301	7168
Pentium4	1	0.2	1212	5753	940



Price/Performance

Benchmark date
difference: 10months!

	1x p5 Model 570	1x HP rx5670	1x HP rx4640
Tpc-C Performance	194,391	136,111	161217
Date of posting	July 12th, 2004	Sept. 5, 2003	Nov. 8th, 2004
\$/tpc-C	\$5.62	\$3.94	\$3.94
Processor	Power5 1.9 Ghz	Itanium® 2 1.5 Ghz	Itanium® 2 1.6 Ghz
Core count	4 core/2 socket	4 cores/ 4 socket	4 cores/ 4 socket
L3 cache	72 Mbytes ext.	24 Mbytes on die	36 Mbytes on die
Multithreaded	Yes	No	No
DRAM	128 Gbyte	96 Gbyte	128 Gbyte
OS	AIX 5L V5.3	Red Hat Linux	Red Hat Linux
Database	Oracle 10g Ent. Ed.	Oracle 10g Std Ed.	Oracle 10g Std Ed.
Disks	448 FibreCh.	356 SCSI U320	448 SCSI U320
Discount applied	41.30%	22% server, 16% disk	26.70%

Power5: + 42% Price/Perf.



IBM: much bigger discount !

Price point fixed; Performance Increase



First 14 Windows/Linux TPC Benchmarks

Rank	Sponsor	System	Itanium® 2 tpmC	Price/tpmC	System Availability	Database	Date Submitted	Operating System
1	HP	HP Integrity rx5670 Cluster 64P	1184893.38	5.52 US \$	4/30/2004	Oracle Database 10g Enterprise Edition	12/8/2003	Red Hat Enterprise Linux AS 3
2	HP	HP Integrity Superdome 64P c/s	1082203	5.38 US \$	12/7/2005	Microsoft SQL Server 2005 Enterprise Edition 64bit	6/7/2005	Microsoft Windows Server 2003 Datacenter Edition 64-bit
3	HP	HP Integrity Superdome	786646	6.49 US \$	10/23/2003	Microsoft SQL Server 2000 Enterprise Ed. 64-bit	8/27/2003	Microsoft Windows Server 2003 Datacenter Edition 64-bit
4	HP	HP Integrity Superdome	707102	7.16 US \$	10/23/2003	Microsoft SQL Server 2000 Enterprise Ed. 64-bit	5/20/2003	Microsoft Windows Server 2003 Datacenter Edition
5	NEC	NEC Express5800/1320Xd C/S w/ Express5800/120Rf-2	683575	5.99 US \$	10/5/2004	Oracle Database 10g Enterprise Edition	6/28/2004	SUSE LINUX Enterprise Server 9
6	NEC	NEC Express5800/1320Xd C/S w/Express5800/120Rf-2	609467	6.78 US \$	10/5/2004	Oracle Database 10g Enterprise Edition	4/6/2004	SUSE LINUX Enterprise Server 9
7	NEC	NEC Express5800/1320Xd c/s w/Express5800/12Rf-2	577530.77	7.74 US \$	12/1/2003	Microsoft SQL Server 2000 Enterprise Ed. 64-bit	10/9/2003	Microsoft Windows Server 2003 Datacenter Edition 64-bit
8	HP	HP Integrity rx8620	332265.87	4.48 US \$	7/15/2005	Microsoft SQL Server 2000 Enterprise Ed. 64-bit	7/15/2005	Microsoft Windows Server 2003 Datacenter Edition 64-bit
9	Unisys	Unisys ES7000 Aries 420 Enterprise Server	327829	4.4 US \$	7/29/2005	Oracle Database 10g Enterprise Edition	7/1/2005	Red Hat Enterprise Linux AS 4.0
10	Unisys	Unisys ES7000 Aries 420 Enterprise Server	322805	4.48 US \$	7/29/2005	Oracle Database 10g Enterprise Edition	6/24/2005	Suse Linux Enterprise Server 9
11	Unisys	Unisys ES7000 Aries 420 Enterprise Server	309036.53	4.49 US \$	1/30/2004	Microsoft SQL Server 2000 Enterprise Edition	1/20/2004	Microsoft Windows Server 2003 Datacenter Edition 64-bit
12	Unisys	Unisys ES7000 Orion 540 Enterprise Server	304148.5	6.18 US \$	4/28/2004	Microsoft SQL Server 2000 Enterprise Edition	4/28/2004	Microsoft Windows Server 2003 Datacenter Edition
13	HP	HP rx8620	301225	4.56 US \$	4/15/2004	Microsoft SQL Server 2000 Enterprise Ed. 64-bit	12/18/2003	Microsoft Windows Server 2003 Datacenter Edition 64-bit
14	Unisys	Unisys ES7000 Aries 420 Enterprise Server	291413	4.98 US \$	10/25/2004	Oracle Database 10g Enterprise Edition	5/11/2004	Microsoft Windows Server 2003 Datacenter Edition 64-bit

Source: www.tpc.org Sept. 28th, 2005



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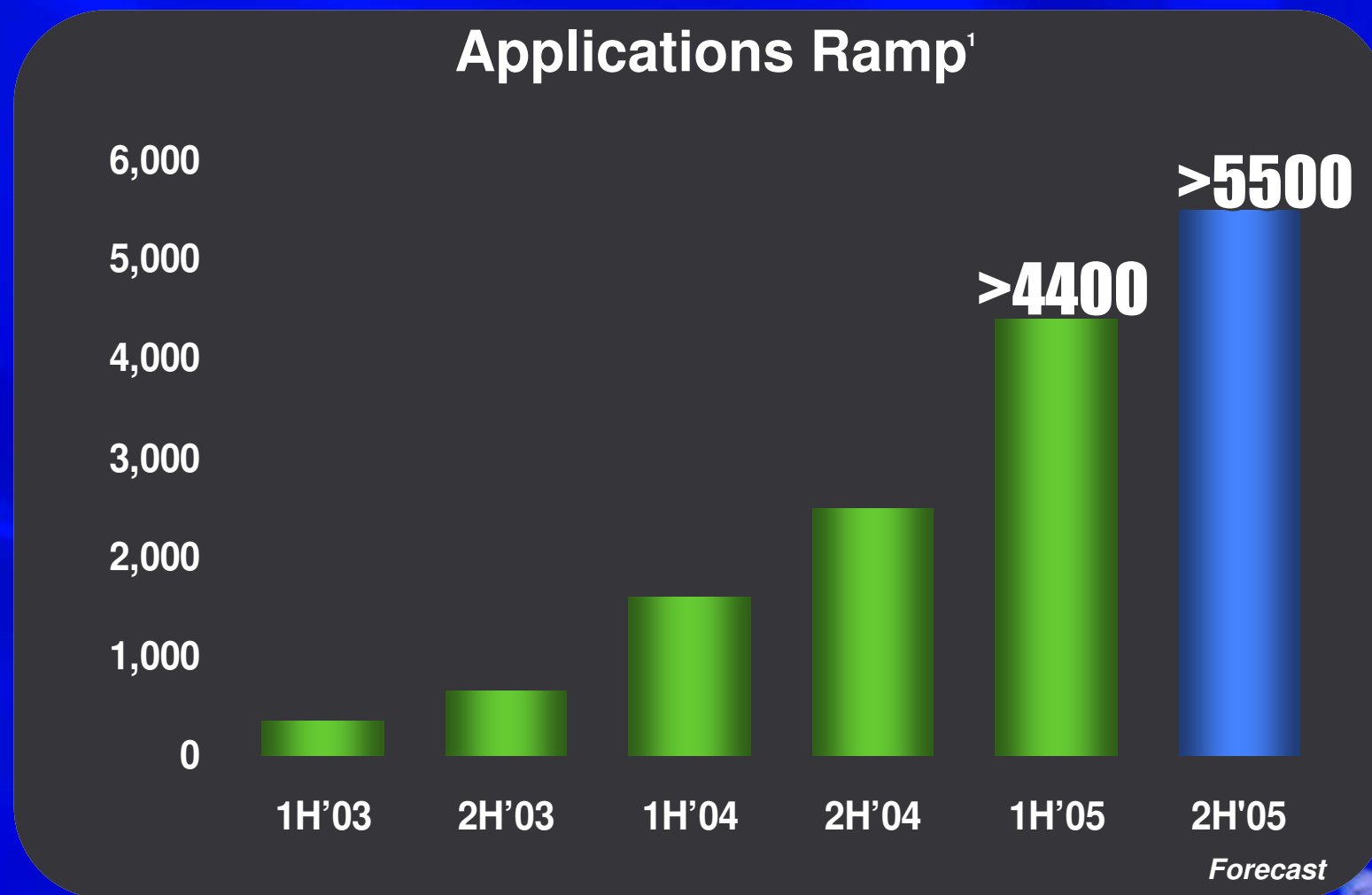
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Itanium® 2 Family Applications



¹ Growth forecast based on current market momentum and adoption.
All dates, product descriptions, availability and plans are subject to change without notice. may not be claimed as the property of others.

Veritas Use of IA-32 Execution Layer

Business need

- Bring VERITAS Foundation Suite and VERITAS Cluster Server software to market quickly to support a growing number of customers interested in deploying Intel® Itanium® 2-based platforms for enterprise computing.

Results

- Intel IA-32 Execution Layer (IA-32 EL) made it possible for VERITAS to keep a significant portion of the application suites in IA-32 code while enabling the software to run well on Itanium 2-based systems.
- Red Hat Enterprise Linux 3.0 with Intel IA-32 EL provided a stable platform for running less performance sensitive IA-32 code on Itanium 2-based platforms.

Solution

- VERITAS Foundation Suite 2.2 and VERITAS Cluster Server 2.2 running on Red Hat Enterprise Linux* 3.0 with Intel IA-32 Execution Layer.

“Customers wanting to run enterprise workloads with Linux on Itanium architecture were interested in the availability of VERITAS products. With IA32 EL, we were able to get our products to market quickly”

Ashvin Kamaraju
Senior Director of
Engineering
VERITAS Software





Enhanced IA-32 Application Support

- **IA-32 Execution Layer (IA-32 EL)** supports IA-32 applications running on Itanium® 2-based systems to help ease migration to Itanium architecture
 - For secondary applications that have not yet ported to Itanium architecture
 - IT managers converting from RISC can tap into the broad IA-32 ecosystem

- IA-32 EL is supported on leading OSs

Operating System	Available
Asianux* 1.0 ¹	✓
Microsoft Windows* Server 2003 Enterprise Edition & Datacenter Edition	✓
Red Flag* Advanced Server 4.1 & DC Server 4.1	✓
Red Hat Enterprise Linux* 3 & 4 ¹	✓
SGI Advanced Linux Environment with ProPack* 3.0	✓
SUSE Linux* Enterprise Server 9	✓

¹ Included in RHEL 3 Update 2 and later versions.

- IA-32 EL improves 32-bit application support over previous hardware-based technology
 - Provides more flexibility to add performance enhancements and support for new IA-32 instructions
- IA-32 EL is a proven solution with wide industry support
 - In production since January 2004
 - Supported by leading OS and hardware vendors
- For more information:
 - [Intel IA-32 EL Web Site](#)

IA-32 EL is broadly available, helping to ease migration to Itanium architecture



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SW Tools, Cross Platform Support

Intel Software Development Products		 Windows* Linux*		   Windows* Linux*		 WinCE* Linux*	
Compilers	C++	●	●	●	●	●	○
	Fortran	●	●	●	●	NA	NA
Performance Analyzers	VTune™ Performance Analyzer	●	●	●	●	●	●
Libraries	Integrated Performance Primitives	●	●	●	●	●	●
	Math Kernel Library	●	●	●	●	NA	NA
Threading Tools	Thread Checker	○	○	●	○	NA	NA
Cluster Tools	Trace Analyzer / Collector	NA	●	NA	●	NA	NA

● Currently available

○ Planned



Single Source Code → Multiple Platforms
 Itanium® 2, Xeon™ (EM64T/32Bit) and XScale™ Processor

Itanium Solution Alliance

The screenshot shows the homepage of the Itanium Solutions Alliance. At the top, the logo "ITANIUM SOLUTIONS ALLIANCE" is displayed in white on a dark background, with a world map to the right. Below the logo is a navigation bar with links: home, about us, join us, news room, events, alliance programs, and members area. A sidebar on the left contains a "news room" section with links to "alliance press releases" (highlighted), "member press releases", "news archive", "analyst & vendor whitepapers", and "press kit". Below this is a "Founded by:" section featuring the Fujitsu Computers and Siemens logos, with a quote from Fujitsu Siemens Computers. The main content area has a headline "LEADING ENTERPRISE AND TECHNICAL COMPUTING PROVIDERS LAUNCH ITANIUM® SOLUTIONS ALLIANCE" and a sub-headline "Broad, New Industry Enabling Programs to Accelerate Delivery of Itanium Solutions to Market". The main text describes the formation of the alliance on September 26, 2005, listing member companies and their goals. A language selector at the top right shows "English" selected. The Intel logo is visible in the bottom left corner of the slide.

ITANIUM SOLUTIONS ALLIANCE

Success is Yours For the Taking. Join Us.

home about us join us news room events alliance programs members area

» news room

alliance press releases

member press releases

news archive

analyst & vendor whitepapers

press kit

Founded by:

FUJITSU COMPUTERS

SIEMENS

"Fujitsu Siemens Computers has delivered innovative infrastructures to customers across EMEA and..."

Select Language: English Go »

LEADING ENTERPRISE AND TECHNICAL COMPUTING PROVIDERS LAUNCH ITANIUM® SOLUTIONS ALLIANCE

Broad, New Industry Enabling Programs to Accelerate Delivery of Itanium Solutions to Market

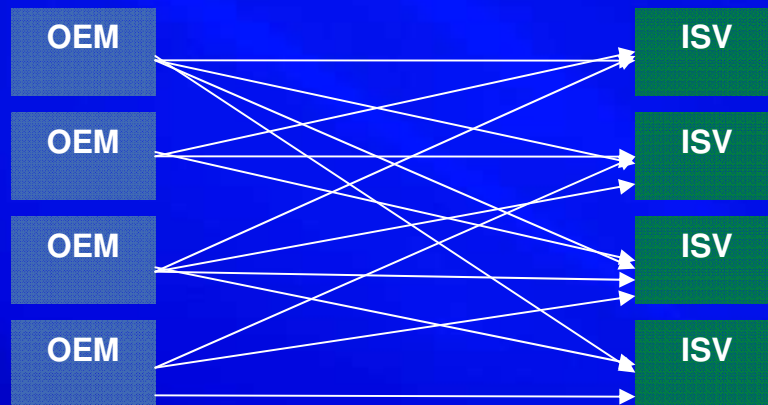
NEW YORK, September 26, 2005 – Top enterprise and technical computing providers Bull, Fujitsu, Fujitsu Siemens Computers, Hitachi, HP, Intel, NEC, SGI and Unisys today announced the formation of the Itanium Solutions Alliance. Leading software vendors BEA, Microsoft, Novell, Oracle, Red Hat and SAS have also joined this organization as charter members; accompanied by early members to include Hyperion, Informatica, MIT Systems, MSC Software, Sybase, Symantec, TIBCO and Trend Micro. This organization will boost availability of Itanium solutions through delivery of a suite of enabling programs targeted at enterprise and technical computing developers. With over 70,000 data center deployments of Itanium systems within the last four years*, formation of the organization underscores the Alliance participants' collective long-term commitment to the expansion of Itanium solutions within enterprise and technical computing environments.

The new Alliance delivers a suite of enabling programs designed to accelerate the availability of Itanium solutions. For customers, this will mean faster time to implementation of the applications most critical to their new business needs. New customers can reap the

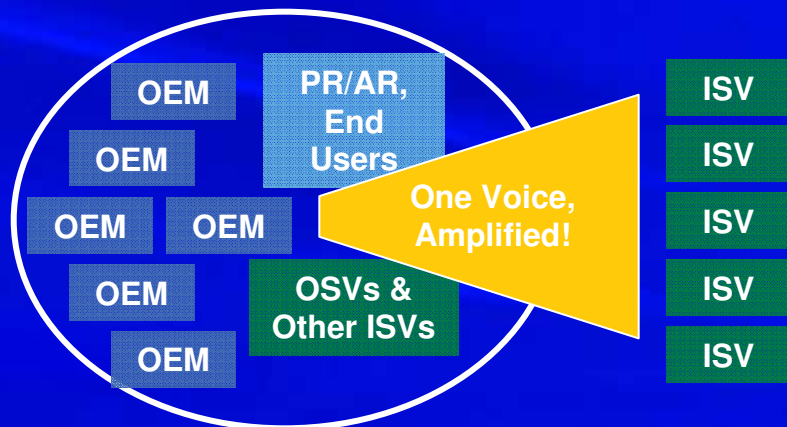
<http://www.itaniumsolutionsalliance.org>



ISA Benefits for the End Customer



- Before the Alliance
 - Multiple, disconnected requests to port
 - Incomplete opportunity data, conflicting priorities



- After the Alliance
 - Cohesive, customer driven
 - Compiled opportunity data & resources
 - Comprehensive tools & services

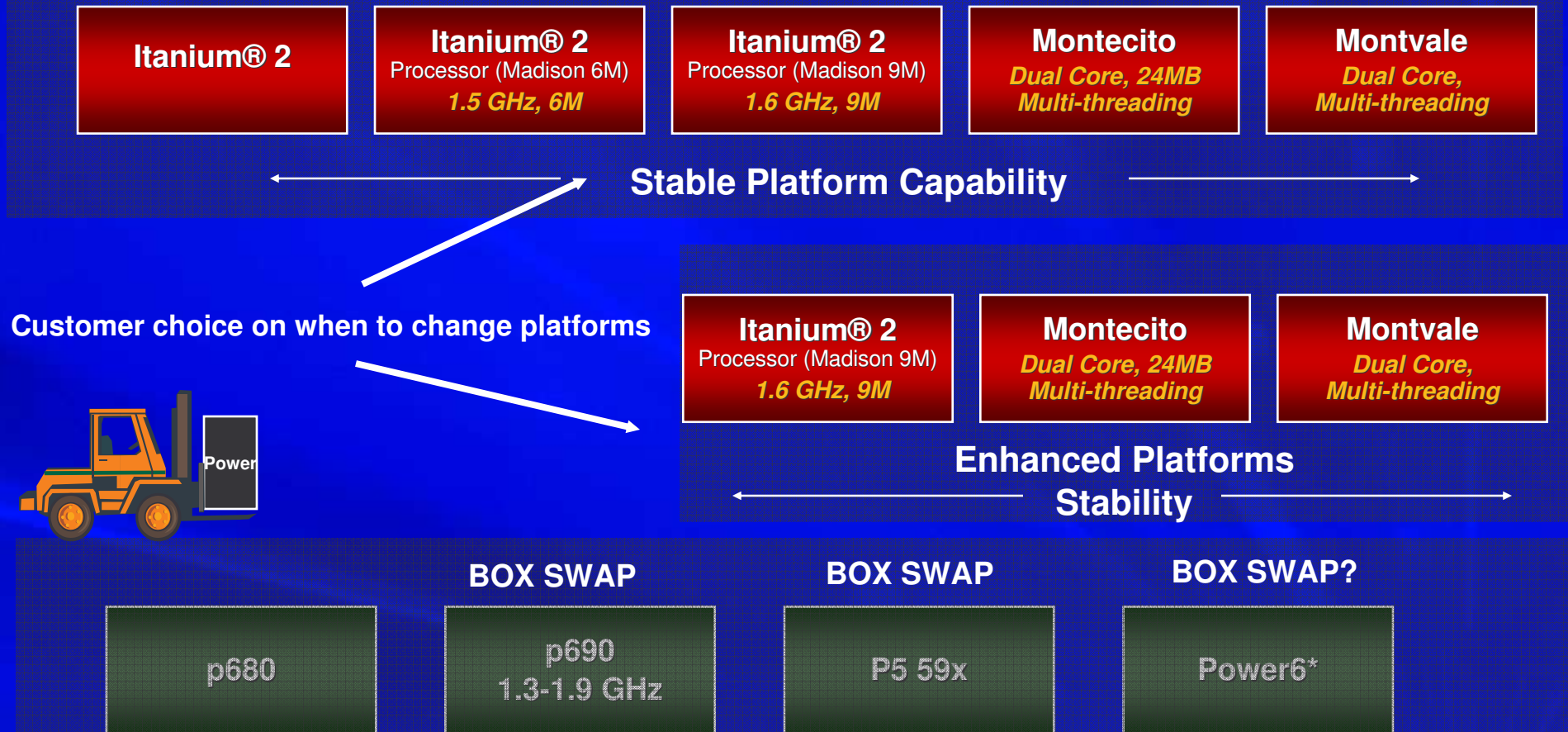
Key Arguments for Itanium®2 Processor



- 1) CHOICE: **HW Platform:** >50 vendors
SW Platform: Windows, HP/UX, and the top 5 Linux
- 2) Scalability: **Itanium® 2 Processor scale from 2 – 512 ways**
- 3) Reliability: **Reliability feature built straight into the Processor Arch.**
- 4) Performance & Price/Performance: **in various public benchmark**
- 5) Software Availability: **>5000 applications certified on the Itanium 2 processor.**
- ➔ 6) Investment protection: **Drop in promise from Itanium® 2 Processor to Montecito
No Box replacement necessary**
- 7) Economy of scale **Itanium® 2 processor based platforms deliver excellent TPC-C Price/Performance**
- 8) Longevity: **Rich Long Term Roadmap.**



Intel® Itanium® Processor Platform Stability



Itanium® Architecture allows smooth transitions and investment protection



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excellent TPC-C Price/Performance**
- 8) Longevity: **Rich Long Term Roadmap.**



Intel's High Volume Mfg – Competitive Adv.



Itanium® 2 Architecture benefits from FABs amortized over IA-32 volumes



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*All 3rd party names and brands are property of their respective owners. All products, plans, dates, and other information provided is preliminary and subject to change without notice

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Intel® Itanium® Processor Family Roadmap

Optimized for **Enterprise**

Itanium® 2

Processor (Madison 9M)
1.6 GHz, 9M, faster FSB

Montecito

**Dual core, 24MB,
HT Technology**

Montvale

**Dual core,
HT Technology**

Tukwila

Multi-core

Poulson

Multi-core

Optimized for **High Performance Computing**

Itanium® 2

Processor (Fanwood)
1.6 GHz, 3M, faster FSB

Montecito

HPC Optimized

Montvale

HPC Optimized

Tukwila/ Dimona

HPC Optimized

Future

HPC Optimized

Optimized for **Low Power/ High Density**

LV Itanium® 2

Processor (LV Fanwood)
1.3 GHz, 3M

LV Montecito

Low Voltage

LV Montvale

Low Voltage

LV Dimona

Low Voltage

Future

Low Voltage

2005

2006

2007

2008

Future

**New
Technologies**

- Dual core with Hyper-Threading Technology
- Intel® Virtualization Technology
- Cache reliability (Pellston)
- Enhanced data integrity (Lockstep)
 - Dynamic performance boost (Foxton)
 - Dynamic power management (DBS)

- Multi-core
- Common platform architecture with Intel® Xeon™ processor MP
- Enhanced RAS
- Enhanced virtualization
- Enhanced I/O & memory



All products, dates, comparisons, and information are preliminary and subject to change without notice.

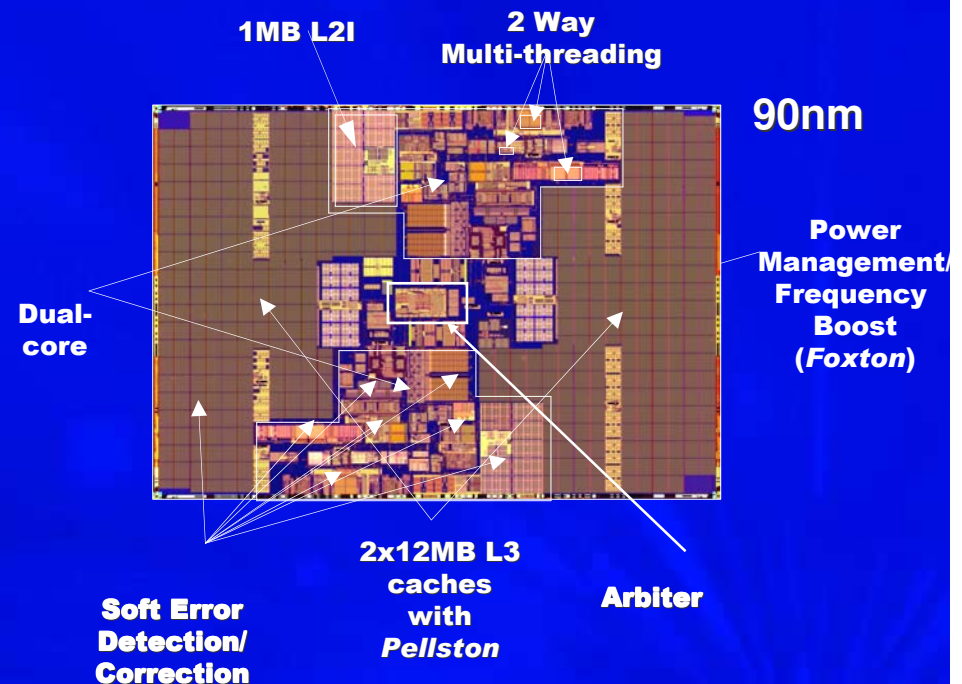
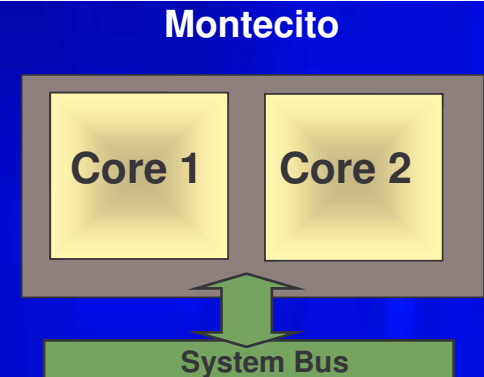
Other names and brands may be claimed as the property of others.

Montecito Summary

➤ Key Processor Features

- Intel's first dual-core processor
- Intel's first processor with >1 billion transistors
- 24 MB L3 cache
- Multi-threading
- Compatible with existing Itanium 2-based systems
- Improved RAS (Pellston Technology)
- Virtualization (VT-i)
- Drop in in existing systems

➤ Targeting H1'2006



**Multiple cores, Multiple threads
and L3 Cache on ONE die !!!**





Cache Reliability *Pellston Technology*

- **Benefits**
 - Automatically disables cache lines in the event of hard cache memory error
 - Removes impact of 2-bit ECC errors in L3 cache that have single bit hard failures
 - Allows processor and system to continue normal operation
- **How it works**
 - 1) Cache line access with error detected
 - 2) Cache line is tested for hard error
 - 3) If hard error is detected, cache line is disabled while processor and system continue normal operation

Pellston helps improve reliability and uptime



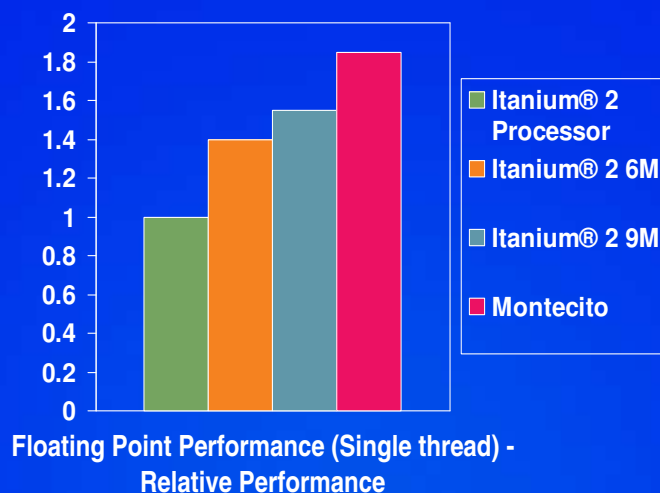
Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. All products, dates, and figures are preliminary and are subject to change without any notice. Copyright © Intel Corporation 2004

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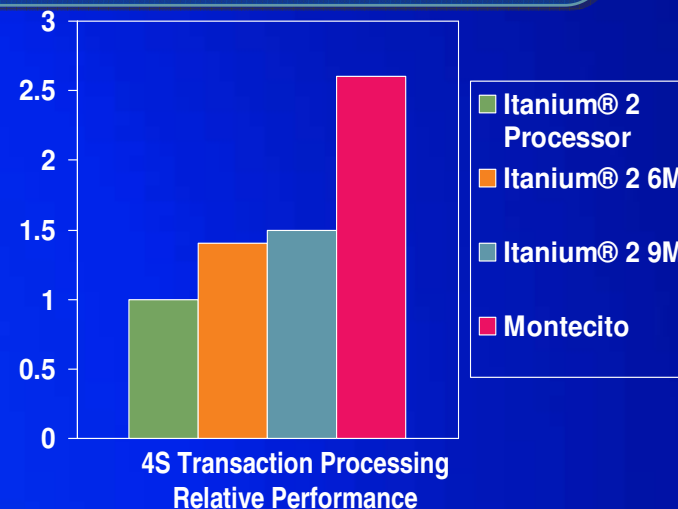
Performance Innovations

- Intel® Itanium® 2 Processor Performance Strategy: increased performance/thread, then increased number of threads

Increased Performance/Thread



Multi-threaded Performance



Driven by:

- Increased frequency
- Increased L3 cache
- Increased bus speed

Driven by:

- Dual core Montecito
- Multi-threading support in Montecito

Montecito: 4 virtual processors

Source: Intel Corporation
All data measured at Intel on current processors. Projections on future processors based on Intel estimates using similar workload testing at Intel (Transaction processing using 64GB of memory, Floating point using 4GB).



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Summary

- **Itanium® 2 Processor Architecture gives CHOICE**
 - Lots of OEMs, ISVs and OSs
- **Itanium® 2 Processor Architecture gives HEADROOM**
 - Excellent Performance & Price/Performance
 - Long term road and commitment by Intel and EcoSystem!
- **Itanium® 2 Processor Architecture well positioned in High End Server Space.**
 - Highly reliable
 - Highly Scalable

